

PROGRESS IN REGIONAL GEOLOGY.

AMONG recent publications in the *Verhandlungen der k.k. geologischen Reichsanstalt* for 1906, it is fair to note that Prof. Hörnes and Dr. Franz Heritsch have replied to Vice-director Vacck's onslaught, the tone of which we regretted in a previous article. The stratigraphy of the picturesque basin of Graz thus receives further explanation (p. 305). Herr Gejza v. Bukowski (*ibid.*, pp. 337, 369, and 397) reports his work in the far south of Dalmatia. Among other points, he notes that the Eocene Flysch changes its lithological character according to that of the rocks on which it lies. Dr. E. Römer's discussion of what he styles "fossil dunes" (*ibid.*, 1907, p. 48) has a wide interest for students of the great European lowlands. The author urges that the post-Glacial valleys, which are cut in the deposits left on the withdrawal of the ice, have exercised a controlling action on the formation and origin of the dunes. Evidences of formerly prevailing east winds, and, later, of our present westerly winds, are clear to him, as to previous observers; but he connects the direction of the dunes with that of the river-valleys, into which the winds blew at right angles to the valley-sides. His studies in Galicia, round the head-waters of the Vistula and the Bug, assure him that the typical barchan, the dune with concave front and outstretched wings, is a phenomenon of deserts, and is constantly in a state of change. The European dune, now often surrounded with peat and itself grown over, is a stable product connected with a climate of steppes, not deserts. Dr. Römer (p. 53) observes how Neolithic settlements were established in the shelter of the dunes, indicating a wetter climate, following on that of the east winds and the steppes. Then a return of the steppe-climate led to the formation of sandbanks over the hearths and dwelling-places; and, finally, our present moister climate has restored the boglands and promoted the growth of trees. Anyone who has seen the winds in Poland laying bare the roots on the outskirts of a clump of pines will realise how easily the present balance may be disturbed, and how a slight meteorological change may allow the dunes again to grow.

In a paper on the Gosau beds of the lower valley of the Enns (*ibid.*, 1907, p. 55), Herr G. Geyer incidentally refers to the occurrence of red psilolithic bauxite in the base of the Cretaceous strata, at the unconformable junction with Triassic dolomite below. Two analyses are given, both with 25 per cent. of ferric oxide and about 50 per cent. of alumina.

The *Tenth Annual Report of the Geological Commission* (for 1905, published in 1906) reaches us from the Cape of Good Hope. Through Prof. Schwarz's appointment to a chair at Grahamstown, the staff of the survey has been reduced to two; but the director, Mr. A. W. Rogers, feels that the grant for travelling is not large enough for the requirements of three officers in the field. A pleasant reference is made to the geological tour of members of the British Association, which Mr. Rogers organised with such conspicuous energy and tact. The director contributes an account of a survey of parts of Uitenhage and Alexandria, with preliminary lists of fossils from the Cretaceous strata. Prof. Schwarz describes the coastal plateau south of the Outeniqua and Long Kloof Mountains, the latter rising to some 5000 feet, and the plateau or large shelf lying at 700 feet, bounded by a bold cliff towards the sea. Prof. Schwarz (p. 82) now regards this shelf as a continental ledge cut by the sea, and subsequently elevated. Mr. du Toit gives, in a paper on the Indwe coal area, a striking plan and section of a dolerite sheet undulating among horizontal beds of sandstone over about 2000 square miles of country. The part played by these intrusive basic rocks in the structure of hill-masses in South Africa is well seen in his other sections. Mr. Rogers revises some of Stow's conclusions in a paper on Hay and Prieska, north of the Orange River. Mineralogists will appreciate his description of crocidolite and its alteration-products (pp. 157-161). An ancient glacial conglomerate is well displayed at the top of the Griqua Town series in this area, while the Permian Dwyka boulder-beds are also represented in places. As an example of the work which a pioneer survey has to undertake, it

may be mentioned that the structure of 4000 square miles of country, in parts impassable through drought, had to be realised in some three months.

More familiar ground is dealt with by Prof. Schwarz (p. 261) in the Ceres and Worcester area, which is known to most dwellers in Cape Town on account of the fine rock-scenery of the coast-ranges along the railway. We wish that the Hex River Valley (pp. 277-9) and some of the adjacent splendid examples of folded strata could have been illustrated by photographs, instead of by the rough sketches employed throughout this paper and the others in the report. Certainly, sunlight and opportunity are not lacking for geological photography in South Africa, and Mr. Rogers's well-known "Geology of Cape Colony" shows how the structure of so bare and open a country lends itself to the intervention of the camera. The report, with its envelope of maps, is a record of unflagging energy; and we have since received sheets 4 (1906) and 2 and 45 (1907) of the colour-printed geological map of the Colony of the Cape of Good Hope, on the scale of 3.8 miles to the inch. The topography is, of course, broadly set down, without representation of the surface-relief; but descriptions of the type of country are written across each distinctive area on sheet 45, and probably this practice will be continued. Sheet 4 includes the Great Berg River from Wellington to its alluvial area in St. Helena Bay, and the Breede River and Hex River on the east side of the watershed, where they cross the strike of the coast ranges in ravines of sandstone that remind one oddly of the limestone *cluses* among the Juras. The synclinal infolds of the Devonian strata are well indicated in the south-east of the map.

In the *Records of the Geological Survey of India*, vol. xxxiv., part iii. (1906), it is pleasant to note a paper by Mr. R. D. Oldham on explosion craters in the Lower Chindwin district, Burma (p. 137). These crater-pits are often occupied by lakes, since they have been excavated by explosive action to a lower level than that of the permanent saturation of the country. They show no sign of heat or of normal eruptions of ash, although they occur in a region of volcanic action. In accepting Mr. Oldham's explanation, we are reminded of the hydrothermal theory of the South African diamond-pipes, and of the trifling amount of contact-alteration on their margins.

In the same part (p. 172), Mr. Vredenburg discusses the "Tertiary system" in Sind, with references to his previous paper on the Foraminifera as zonal guides in this group of strata. In the field, he finds that the group, previously regarded as a continuous one, "includes five totally independent series," the unconformities between them being fortunately clear in Baluchistan. The basal series is thrown back to the Senonian, the supposed passage-beds into the Eocene disappear, and there are evidences of disturbance at the top of the Eocene and in Middle Miocene and Pliocene times. In Sind, layers of laterite, formed on low-lying continental surfaces (p. 179), represent the stratigraphical breaks. The amended classification leads to a re-examination of the Echinoidea described by Duncan and Sladen in 1882-6, and Mr. Vredenburg is able to separate faunas formerly, and somewhat naturally, confused. The stratigraphical breaks become all the more emphasised by this revision of the genera and species. The paper has thus a considerable additional interest for students of fossil Echinodermata.

Going further east, Herr Georg Boehm adds considerably to his previous exploration of Jurassic strata from Celebes to New Guinea ("Neues aus dem Indo-Australischen Archipel," *Neues Jahrbuch für Min., &c.*, Beilageband xxii., 1906, p. 385). In Buru, contemporaneous volcanic ashes are found containing ammonites and belemnites (p. 399). The occurrence of European species in the Far East is regarded as surprising, but is paralleled, as the author points out, by facts in animal distribution at the present day. *Argonauta argo* and *Octopus vulgaris* are cited as examples.

The *Geological Survey of New Zealand* forwards to us Bulletin No. 2, a quarto on the "Geology of the Alexandra Sheet, Central Otago Division," by Prof. James Park, of the University of Otago. The region is a mountainous one in the South Island, and is of importance in the production of gold. The possibility of the alluvial gold having

been derived from folia of quartz in the old mica-schists, a view quoted (p. 33) with hesitation from Mr. A. McKay, reminds us of the problems of the Klondike. The uptilted lacustrine gravels, on which the Pleistocene moraines rest unconformably, are regarded provisionally as Pliocene, but raise an interesting stratigraphical question. The photographic illustrations, one of which we reproduce, are admirable, and may be commended to the notice of the authorities who hold the public purse at Cape Town. The petrographic section, where the rocks are described from the point of view of the laboratory, includes analyses of several of the schists, and photographs of rock-slices on the unnecessarily liberal scale adopted in the first bulletin of this survey.

The *Summary Report of the Geological Survey Department of Canada* for 1906, which bears two dates on its title-page, 1906 and 1907, informs us that the survey has decided to send its maps and reports "free to any *bona fide* applicant in Canada." This surpasses even the generosity of the United States Survey, which still, we believe, places a price upon its maps. The colour-printed sheets of part of Nova Scotia, surveyed by Mr. Hugh Fletcher, and sent us with the report, are as large as those for which we charge eighteenpence in England. Of course the topography shows far less detail, but the scale is, like ours, one inch to one mile, and the sheets have the price



The Manuherikia River, New Zealand, forming a gorge along 'ault-rifts in the schist series.

of 10 cents printed on them. We gather, however, on the other hand, that the sums paid in Canada to the junior members of the staff are not at all adequate, considering the competition with mining companies, which draw away the best geologists. The same difficulty has been met in India (Circular of the Department of Commerce and Industry, September 7, 1906) by a courageous increase in the salaries of the official geologists. The Canadian Survey spreads its operations over an enormous field, the areas examined being largely determined by the economic requirements of the year. The routes of projected railways naturally receive attention. This is Mr. A. P. Low's first annual report.

We fancy that Mr. G. R. Mansfield's paper on the Roxbury conglomerate near Boston (*Bull. Mus. Comp. Zoology at Harvard*, vol. xlix., 1906, pp. 91-272) would not have been a third as long had it not been presented as a thesis for a degree. Pages 105-151 contain a disquisition on conglomerates in general, according to the custom of American geologists when introducing a special subject in a literary form. The conclusions on p. 259 make us wonder whether the Roxbury conglomerate was worth describing at all; but this is probably because our sense of irritation, in this busy world, inclines to make us unfair to an obviously accurate observer.

G. A. J. C.

THE FEDERAL CONFERENCE ON EDUCATION.

IT is often made evident that the Government in this country leaves very important matters to be initiated and even carried on by private enterprise. Those who do not already know, will hardly be surprised to learn that the Federal Conference on Education, which was opened by Lord Crew on May 24 in Caxton Hall, was organised by an independent society, the League of the Empire, and the League may well be proud, for it is understood that the next conference, which will be held in 1911, will be convened by the Government.

The business of the conference was divided as follows:—There were first of all the meetings of the representatives of colonial and Indian education departments and their committees. These took place behind closed doors, and were attended by the officials of the English, Welsh, Scotch, and Irish Boards. This official conference discussed a number of important matters, and we give some of the results of their deliberations. For instance, they decided that at present, owing to the way in which certificates are awarded and various local conditions, it is impossible to arrive at any complete recognition of the teachers' certificates issued by different educational bodies in different parts of the Empire. The desirability was recognised of

teachers and inspectors acquiring experience in other parts of His Majesty's dominions than their own, and the conference thought that financial and administrative arrangements should be made to enable this to take place.

While it was not deemed desirable to attempt uniformity as to curricula and text-books, it was urged that the different education departments should define year by year with precision the terms used in their publications. Other important conclusions expressed were that a conference of representatives chosen by the Governments should be held every four years, and that the Imperial Government should summon the first. Furthermore, the present conference was unanimously agreed as to the importance of a central bureau of educational information.

The next series of meetings to be considered are those of the full conference, consisting of the representatives already mentioned and delegates from universities and associations. On Monday, May 27, Lord Reay presided,

and higher technological education was considered, and various speakers, including Prof. Hopkinson (of Cambridge), Dr. Headlam (Principal of King's College, London), Dr. Bodington (Vice-Chancellor of the University of Leeds), and Dr. G. R. Parkin (University of New Brunswick), urged that technical training should go on side by side with the study of classics, poetry, and philosophy. Afterwards the following resolution, proposed by Dr. Clay, was unanimously agreed to:—

"That it is desirable that the Colonial Office and the Board of Education should cooperate in issuing officially, particulars as to the courses of study, fees, expenses of living, &c., at colonial universities, technical colleges and agricultural colleges, together with statements of the advantages attaching to their degrees and diplomas, and that information should be circulated in the colonies as to similar advantages and facilities which exist in this country."

On the following day, Mr. Inch (Superintendent of Education, New Brunswick) took the chair, and Mr. C. W. Bailey (Liverpool University) supported the idea that freedom should be given to each individual school, while Dr. H. J. Spencer (Headmasters' Association) pointed out with regard to the suggestion that each school should shape its own curriculum according to the needs of its pupils that there were several types of a good general education, any one of which might be chosen.